UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790.904	03/02/2004	Jason L. Mitchell	00100.02.0045	2636

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EXAMINER
PAPPAS, PETER

ART UNIT	PAPER NUMBER
2628	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/790,904	MITCHELL ET AL.
	Examiner	Art Unit	
	Peter-Anthony Pappas	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 November 2007*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7 and 9-19* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 9-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some *   c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2.   Claims 1-7 and 9-16 are rejected under 35 U.S.C. 102(e) as being anticipated by

Duluk, Jr. et al. (U.S. Patent No. 6, 577, 317 B1).

3.   In regard to claim 1 it is noted that said claim language includes open-ended

language (e.g., comprising) and therefore it is noted that said claim is not considered

limited to only the limitations disclosed. Duluk, Jr. et al. teaches an apparatus and

methods for rendering 3D graphic images preferably includes a port for receiving

commands from a graphics application, an output for sending a rendered image to a

display and a geometry-operations pipeline, coupled to the port and to the output, the

geometry-operations pipeline including a block for performing transformations

(Abstract).

        The command-fetch-and-decode block 841 handles communication with the host

computer through the graphics port. It converts its input into a series of packets, which

it passes to the geometry block 842. Most of the input stream (packets) consists of

geometrical data, that is to say, vertices that describe lines, points and polygons (col. 6, lines 23-28).

The geometry block 842 transforms incoming graphics primitives into a uniform coordinate space ("world space"). It then clips the primitives to the (bounding volume object) viewing volume ("frustum"). In addition to the six planes that define the viewing volume (left, right, top, bottom, front and back), the subsystem provides six user-definable clipping planes (col. 6, lines 38-43). Duluk, Jr. et al. further teaches that the trivial reject/accept test for both the user defined and the view volume clip planes are performed on each vertex (col. 13, lines 35-36). It is noted that the view volume (bounding volume object) illustrated in Fig. 1 includes a triangulated object (geometric representation of a specific object) for display (said triangulated object is identified as geometry whose visibility status is desired).

There are four types of packets output from the geometry block 842: color vertex, spatial vertex, propagated mode, and propagated vertex (col. 17, lines 7-10). A Color Vertex packet contains the properties associated with a vertex's position. Every vertex not removed by back face culling or clipped off by volume clip planes (trivial reject or multiply planes exclude complete polygon) produces a single vertex color packet. A Spatial Vertex packet contains the spatial coordinates (indices) and relationships of a single vertex. Every input vertex packet not removed by back face culling or clipped off by volume clip planes (trivial reject or multiply planes exclude complete polygon) produces a spatial vertex packet corresponding to the exact input vertex coordinates (col. 17, lines 14-29). It is noted that the creation of packetized vertex information (e.g.,

color vertex packets, spatial vertex packets and/or propagated vertex packets) from said

series of packets passed to geometry block 842 is considered to read on draw packets

with a set visibility query identifier as the creation of said packetized vertex information

is an indication that a given packet from said series of packets passed to geometry

block 842 was not culled or clipped (e.g., discarded). Duluk, Jr. et al. teaches rendering

information stored within said set visibility query identifier packets to a display once said

information is further processed by the pipeline illustrated in Fig. 3.

4.   In regard to claim 2 it is noted that the respective claim language fails to disclose

what constitutes a command processor and therefore geometry block 842 in

combination with mode-extraction block 843 are considered to read on elements of a

command processor. Duluk Jr., et al. teaches prior to rendering the draw packets

providing the draw packets to a mode-extraction block 843 such that the command

processor checks for the set visibility query identifier ("...The mode-extraction block 843

separates the data stream into two parts: vertices and everything else..." – col. 6, lines

51-55).

5.   In regard to claim 3 the rationale disclosed in the rejection of claim 1 is

incorporated herein (col. 17, lines 14-29).

6.   In regard to claim 4 the rationale disclosed in the rejection of claim 1 is

incorporated herein ("...geometry block 842...then clips the primitives to the viewing

volume..." – col. 6, lines 38-43; "...There are four types of packets output from the

geometry block 842: color vertex, spatial vertex..." – col. 17, lines 7-10). As previously

disclosed said spatial vertex packet contains the spatial coordinates and relationships of

a single vertex (col. 17, lines 14-29). It is noted that said spatial coordinates and said

spatial relationships would not be available if a given spatial vertex packet, which is

indicated as containing data relevant to visibility by virtue of the fact that is was

generated and not culled or clipped, was not output by geometry block 842.

7.   In regard to claim 5 Duluk, Jr. et al. teaches that a duration counter tracks the

time a vertex is in the stage 212 of the transformation unit (col. 20, lines 37-38; Fig. 4).

Said transformation unit is part of geometry block 842 (Fig. 2) and geometry block 842

is located before mode-extraction block 843. Stage A 212 could require more than one

pipeline cycle to process the packet, depending on the type of packet it is and the state

that is set in the stage. If more than one pipeline cycle is required, the stage raises the

Pipeline_Full signal. If Pipeline_Full is raised, the unit controller is not allowed to

advance the next packet down the pipe. When the stage detects that the packet will

complete in the current stage, the Pipeline_Full signal is cleared, and just as the unit

controller advanced the command register of stage A, stage A advances the command

register of stage B (col. 18, lines 43-52).

8.   In regard to claim 6 (specifically view frustum comparison) the rationale disclosed

in the rejection of claim 1 is incorporated herein (col. 6, lines 38-43; col. 13, lines 35-36).

9.   In regard to claim 7 the rationale disclosed in the rejection of claims 1-4 are

incorporated herein.

10.   In regard to claim 9 the rationale disclosed in the rejection of claim 5 is

incorporated herein.

11. In regard to claim 10 the rationale disclosed in the rejection of claim 6 is incorporated herein.

12. In regard to claim 11 Duluk, Jr. et al. illustrates in Fig. 8 that said apparatus includes CPU 810 (general processing unit) and memory 820 (memory device) for storing CPU-executable instructions (software 821). The rationale disclosed in the rejection of claim 1 is incorporated herein.

13. In regard to claim 12 the rationale disclosed in the rejection of claim 2 is incorporated herein.

14. In regard to claim 13 the rationale disclosed in the rejection of claim 3 is incorporated herein.

15. In regard to claim 14 the rationale disclosed in the rejection of claim 4 is incorporated herein.

16. In regard to claim 15 the rationale disclosed in the rejection of claim 5 is incorporated herein.

17. In regard to claim 16 the rationale disclosed in the rejection of claim 6 is incorporated herein.

Claim Rejections - 35 USC § 103

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

19.   Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Duluk, Jr. et al. (U.S. Patent No. 6, 577, 317 B1), as applied to claims 1-7 and 9-16, in

view of Migdal et al. (U.S. Patent No. 5, 886, 702).

20.   In regard to claim 17 the rationale disclosed in the rejection of claim 1 is

incorporated herein. However, Duluk, Jr. et al. fails to explicitly teach wherein the

geometric representation of the specific object is a low resolution model of the specific

object that is rendered prior to a detailed model of the specific object. Migdal et al.

teaches a system and method for dynamic resolution capabilities in the level of detail for

creating meshes (col. 4, lines 54-67; col. 5, lines 1-12), wherein a geometric

representation (e.g., mesh) of a specific object (e.g., face) is a low resolution model of

the specific object that is rendered prior to a detailed model of the specific object being

rendered (col. 7, lines 65-67; col. 8, lines 1-13; Figs. 2b-2f).

It would have been obvious to one skilled in the art, at the time of the Applicant's

invention, to incorporate the teachings of Migdal et al. into the system taught by Duluk,

Jr. et al., which is directed toward geometry operations in a 3D graphics pipeline (col. 1,

lines 63-67), because through such incorporation it would provide greater flexibility over

the geometry processed by said system by allowing, for example, an operator of system

to specify geometry of greater or lower detail depending upon the requirements that

need to be met at a given point in time while still allowing said geometry to later be

altered (by having its resolution increased or decreased). The addition of this flexibility

would result in a more optimized and efficient system then if said flexibility was not

present.

21.   In regard to claim 18 the rationale disclosed in the rejection of claims 2 and 4 are

incorporated herein.

22.   In regard to claim 19 the rationale disclosed in the rejection of claim 5 is

incorporated herein.

Response to Arguments

23.   In response to Applicant's remarks that clipping, as taught by Duluk, Jr. et al.,

appears to be performed only against non-visible volumes it is noted that the Examiner

fails to find support in Duluk, Jr. et al. to support the position that clipping only is

performed against non-visible volumes. In response to Applicant's remarks that the

viewing volumes taught by Duluk, Jr. et al. are not visible themselves the Examiner

notes that the view volumes do not appear to be rendered in color but they are identified

by a viewing frustum, which can be user-defined, and therefore may or may not be

visible depending on how the Applicant defines visibility. For example, if you have a

space void of color but said space includes an object of color, wherein said object does

not occupy all of said space, is said space visible? It is the position of the Examiner that

said space is visible when viewed with respect to said object. Simply put there exists

something other then said object which is visibility identifiable (e.g., space). From

reading Applicant's remarks it appears to the Examiner that the Applicant is implying

that the bounding volume claimed is in fact a visible object. If this is the case the

Examiner does not feel that the respective claim language supports this position. The

Examiner encourages the Applicant to contact the Examiner to discuss this issue.

24.   In response to Applicant's remarks in regard to the newly amended claim language the Applicant is directed to the respective rejections above.

25.   Applicant's remarks have been fully considered but are not deemed persuasive.

Conclusion

The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure: Menon et al. (U.S. Patent No. 5, 926, 182) and Menon et al. (5, 926, 183).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter-Anthony Pappas whose telephone number is 571-272-7646. The examiner can normally be reached on M-F 9:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on 571-272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Peter-Anthony Pappas
Examiner
Art Unit 2628

PP